



INTERNATIONAL  
CONFERENCE ON  
GREEN TECHNOLOGY  
AND DESIGN



# Book of Abstracts

**The 3rd International Conference on Green  
Technology and Design 2021:**

**Human Behavior and Its  
Relevance in Technology and  
Design Research for  
Supporting The Recovery of  
Post-Pandemic Environment**

**Institut Teknologi Nasional  
Bandung, Indonesia**

**December 2-3, 2021**



# **BOOK OF ABSTRACT**

## **INTERNATIONAL CONFERENCE ON GREEN TECHNOLOGY AND DESIGN 2021**

Bandung, 2 – 3 December 2021

Institut Teknologi Nasional Bandung  
West Java - Indonesia

 **penerbit** itenas



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# CONFERENCE PROGRAM

Time	PROGRAM	
<b>Day 1 (2<sup>nd</sup> December 2021, Thursday)</b>  <i>Link:</i> <a href="https://bit.ly/icgtd2021">https://bit.ly/icgtd2021</a> Password: icgtd2021		
08:30 – 08:40	<b>Opening Ceremony (zoom plenary session)</b> Welcome remark by master of ceremony (bu Tuty)	
08:40 – 08:50	<b>Opening remark (zoom plenary session)</b> Rector of Insitut Teknologi Nasional Bandung (Itenas) Prof. Meilinda Nurbanasari, Ph.D.	
08:50 – 09:30	<b>Panel 1 (zoom plenary session)</b> <b>Keynote speaker 1: Prof. Kagami Haruya</b> (Kanazawa University, Jepang) Moderator: Maharani Dian Permanasari, M.Ds., M.Phil., Ph.D.	
09:30 – 10:10	<b>Panel 2 (zoom plenary session)</b> <b>Keynote speaker 2: Dr. Korhan Cengiz</b> (University of Fujairah, United Arab Emirates) Moderator: Dr. sc. Lisa Kristiana	
10:10 – 10:20	<b>Break Session -MC</b>	
<b>PARALLEL SESSION</b>		
<b>Zoom Link</b>	<i>Link Room 1:</i> <a href="https://bit.ly/icgtd2021">https://bit.ly/icgtd2021</a> Password: icgtd2021	<i>Link Room 2:</i> <a href="https://bit.ly/icgtd2021">https://bit.ly/icgtd2021</a> Password: icgtd2021
10:20 – 10:50	<b>Parallel session 1</b> <b>Moderator:</b> Vibianti Dwi Pratiwi, M.T. Green Automation (GA), & Smart Transportation (ST)	<b>Parallel session 2</b> <b>Moderator:</b> Lita Lidyawati, M.T. Intelligent Information and Communication Technology (IICT)
10:50 – 12:00	<b>Parallel session 1</b> <b>Moderator:</b> Vibianti Dwi Pratiwi, M.T. Green Energy (GE)	<b>Parallel session 2</b> <b>Moderator:</b> Lita Lidyawati, M.T. Intelligent Information and Communication Technology (IICT)
12:00 – 13:00	<b>BREAK</b>	
13:00 – 14:15	<b>Parallel session 1</b> <b>Moderator:</b> Wuri Widyani, M.Ds. Smart Materials and Adaptable Design (SMAD)	<b>Parallel session 2</b> (Continue) <b>Moderator:</b> Dr. sc. Lisa Kristiana Intelligent Information and Communication Technology (IICT)
14:15 – 14:30	<b>Parallel session 1</b> <b>Moderator:</b> Rika Hernawati, M.T. Green Building (GB)	<b>Parallel session 2</b> <b>Moderator:</b> Maharani Dian Permanasari, M.Ds., M.Phil., Ph.D. Sustainability Environment (SE)
14:30 – 16:00	<b>Parallel session 1</b> <b>Moderator:</b> Rika Hernawati, M.T. Sustainability Environment (SE)	

## Day 2 (3<sup>rd</sup> December 2021, Friday)

*Link:*

<https://bit.ly/icgtd2021>

Password: icgtd2021

08:25 – 08:30	Registration and Opening Day 2 -MC (bu Tuty) Gd. Fakultas Lt. 3
08:30 – 09:10	<b>Panel 1</b> <b>Keynote speaker 3: Dr. Nittin Muttill</b> (Victoria University, Melbourne, Australia) Moderator: Iwan Juwana, S.T. M.EM., Ph.D.
09:10 – 9:50	<b>Panel 2</b> <b>Keynote speaker 4: Dr. Riny Yolandha</b> (ITENAS, Indonesia) Moderator: Dr. Didin Agustian Permadi
9:50 – 10:15	<b>Break Session</b>
10.15 – 11.00	<b>Plenary session &amp; Closing -MC</b>  <i>Link:</i> <a href="https://bit.ly/icgtd2021">https://bit.ly/icgtd2021</a> Password: icgtd2021  <b>Award announcement</b> <ol style="list-style-type: none"><li>1. Best Paper</li><li>2. Best Presenters</li><li>3. Best Participants</li><li>4. Best Selfie Unique</li><li>5. Lucky Draw</li></ol>

## PRESENTATION SCHEDULE

Session name	Presenter / paper title	Time	Institution
<b>Day 1 (2<sup>nd</sup> December 2021, Thursday)</b>			
Link Room 1 : <a href="https://bit.ly/icgtd2021">https://bit.ly/icgtd2021</a> Password: icgtd2021			
Green Automation (GA)	ID1 - Tarsisius Kristyadi et al. - Experimental Study Of Military Electric Car Performance	10.20	Institut Teknologi Nasional Bandung
Smart Transportation (ST)	ID24 – Dewi Rosmala et al. – Optimization of The K-Means Algorithm For The Classification Of Public Transportation Feasibility	10.35	Institut Teknologi Nasional Bandung
Green Energy (GE)	ID6 – Hamasah A. Al-Madani et al. – Comparison of methane emission inventory between the IPCC and LandGEM approach in a tropical landfill	10.50	Birmingham University & Institut Teknologi Nasional Bandung
	ID4 – Herawati et al. – Biodiesel Production from Rubber Seed Oil as An Alternative Energy Source – A Review	11.05	Politeknik Negeri Bandung
	ID5 – Hasna Mutiara Safitri et al. – Effect of Co-solvent Addition on Biodiesel from Rubber Seed Waste	11.20	Politeknik Negeri Bandung
Break			
Smart Materials and Adaptable Design (SMAD)	ID19 – Syifa Ruri Sandyanti et al. – Literature Review on Production of Starch-based Bioplastic as Substitute for LDPE/HDPE Plastic	13.00	Politeknik Negeri Bandung
	ID20 – Maharani Dian Permanasari et al.– Blended Workshop (online and offline) in Utilizing Banana Bark into Placemats	13.15	Institut Teknologi Nasional Bandung
	ID21 – Wiwi Isnaini et al.– MOOCs, An Educational Disruption as Brand Touchpoints for Private Universities	13.30	Institut Teknologi Nasional Bandung
	ID22 – Hubert Fernaldy et al.- PANON (PORTABLE TENT STOVE)	13.45	Hocshule Hannover Applied Sciences and Arts & Institut Teknologi Nasional Bandung
	ID23 –Muhammad Syafiqha Alfaatihah A et al.– Modular Vertical Garden As A Practical Solution For Urban Gardening	14.00	Institut Teknologi Nasional Bandung
Green Building (GB)	ID2 – Edi Setiadi Putra– Tropical Ornamental Plant Hydroponic Product Design For Green Building Aesthetics	14.15	Institut Teknologi Nasional Bandung

Session name	Presenter / paper title	Time	Institution
Sustainability Environment (SE)	ID25 – Afifah Fauziah Huwaida et al. – The Evaluation of Seeding Process of Tofu Wastewater Treatment in Anaerobic Sequencing Batch Reactor	14.30	Politeknik Negeri Bandung
	ID26 – Dianta Mustofa Kamal et al. – The Characteristic of Adding Waste Cooking Oil on Bio-Pellets after Four-Week Storage	14.45	Politeknik Negeri Jakarta
	ID27 – Herawati et al. – Tofu Wastewater Treatment by Using Sequencing Batch Reactor (SBR) with Variation of Feeding	15.00	Politeknik Negeri Bandung
	ID28 – Vibi Dwi Pratiwi et al. – The Extraction Of Curcuminoids From Ethnol Extract Of Yellow Turmeric (Curcuma Longa L) And Its Activity Test On P-388 Murine Leukemia Cells	15.15	Institut Teknologi Nasional Bandung
	ID29 – Dian Handiani et al. – Coastal Vulnerability Index along the North Coast Java-Indonesia	15.30	Institut Teknologi Nasional Bandung
	ID30 – Muhamad Rizki et al.– Mobility restriction policy effect to travel-activity participation after the policy lifted: Evidence from the COVID-19 outbreak in Indonesia	15.45	Institut Teknologi Nasional Bandung
	ID32 – Sifa Novwidia Agni et al. - Implementation Evaluation Smart Mobility in Jakarta (Evaluation of Smart Mobility Implementation in Jakarta)	16.00	Universitas Indonesia
	ID33 – Raina Cahya Gunadi et al. – Potential Trends Of Cycling Mobility During The New Normal Covid-19 In Bandung City (Case Study In Coblong And Bandung Wetan Districts)	16.15	Institut Teknologi Nasional Bandung
<b>Link Room 2 :</b> <a href="https://bit.ly/icgtd2021">https://bit.ly/icgtd2021</a> <b>Password: icgtd2021</b>			
Intelligent ICT (IICT)	ID10 – Lisa Kristiana et al. – Obstacle Awareness System of An Indoor UAV with Multi-Sensor Fusion Algorithm	10.20	Institut Teknologi Nasional Bandung
	ID8 – Arief Irfan Syah Tjaja et al. – The effect of Collaborative Network, Information Sharing, and Resource Sharing on Fresh Fruits Supply Chain Performanc	10.35	Universiti Teknikal Malaysia Melaka & Institut Teknologi Nasional Bandung
	ID9 – HM. Hartono et al. – Electricity Demand Forecasting By Using Modified Fuzzy Logic	10.50	Universitas Sultan Ageng Tirtayasa
	ID7 – Edi Susanto et al. – The Relationship Between Collaborative Performance System and Supply Chain Performance: A Study in Fresh Produce	11.05	Universiti Teknikal Malaysia Melaka & Institut Teknologi Nasional Bandung
	ID11 – Yusup Miftahuddin et al– Identification the Face Image of the Sick Sheep using Visual Geometry Group (VGG) 19	11.20	Institut Teknologi Nasional Bandung
	ID12 – Dewi Rosmala et al. – Otsu Thresholding On Monitoring System PDAM Water Meter	11.35	Institut Teknologi Nasional Bandung



Session name	Presenter / paper title	Time	Institution
	ID13 – Budi Raharjo – Discovering and Evaluating Alignment of Process Models with SOP using Three Different Predictive Methods	11.50	Institut Teknologi Nasional Bandung
	Break		
	ID14 – Ung Ungkawa, et al.– Application of Kalman Filter and Fuzzy Logic to Control Temperature and Humidity of Tempe Incubator	13.00	Institut Teknologi Nasional Bandung
	ID15 – Yusup Miftahuddin, et al.– Relevance Vector Machine In Glaucoma Eye Disease Identification System	13.15	Institut Teknologi Nasional Bandung
	ID16 – Henri Kuncoro et al. – Estimation of Baribis Fault Slip Rates Using 2016-2019 GPS Data Observations	13.30	Institut Teknologi Nasional Bandung
	ID17 – Kurniawan Eka Permana et al. – Salt Water Monitoring System : A Prototype IoT Platform	13.45	University Trunojoyo Madura
	ID18 – Zul Afief Akbar et al. – Wind Farm Sites Selection Using GIS and Multi-Criteria Analysis: The Case of Sumba Island - Indonesia	14.00	Institut Teknologi Nasional Bandung
Sustainability Environment (SE)	ID34 – Didin Agustian Permadi et al– Model and observation – based estimation of methane emission emitted from the landfills in Indonesia	14.15	Institut Teknologi Nasional Bandung
	ID35 – Iwan Juwana et al.– The application of Safe Water Garden (SWG) technology as an option for the reduction of greenhouse gas emissions from the wastewater sector	14.30	Yayasan Loola Komunitas Safe Water Gardens (SWG) Pte Ltd, Singapore & Institut Teknologi Nasional Bandung
	ID36 – Enni Lindia Mayona – Social Evolution: A Critical Review of Ecological City (Ecocity) Research and Practice	14.45	Institut Teknologi Nasional Bandung
	ID37 – Isro Saputra et al. – Exploring urban congestion patterns in Metropolitan during the COVID-19 pandemic based on Google Maps: Insights from Metro Bandung, Indonesia	15.00	Institut Teknologi Nasional Bandung
	ID38 – Soni Darmawan et al. – Mapping of Oil Palm Age Based on Google Earth Engine Toward One Data Oil Palm Management	15.15	Institut Teknologi Nasional Bandung
	ID39 – Byna Kameswara et al. – Are There Any Changes in Travel Behavior? Investigation of The Impact on The Bandung Metropolitan Area Due to The Covid-19 Pandemic	15.30	Institut Teknologi Nasional Bandung
	ID40 – Mila Dirgawati et al. – The Influence of Land Use on the Characteristics of Organic Compound in Water	15.45	Institut Teknologi Nasional Bandung
	ID41 – Marc van Loo et al- The use of Safe Water Bricks (SWB) in the construction of Safe Water Garden (SWG) as an option for the reduction of greenhouse gas emissions from plastic waste	16.00	Yayasan Loola Komunitas Safe Water Gardens (SWG) Pte Ltd, Singapore & Institut Teknologi

Session name	Presenter / paper title	Time	Institution
			Nasional Bandung
	ID42 – Raditya Tri Prabowo– TPS-3R Functional Level Measurement Tool Design and Development (Case Study in Bandung City TPS-3R)	16.15	Institut Teknologi Nasional Bandung
	ID43 – Siti Ainun - Identification of thermochemical conversion potential at the Sarimukti landfill for waste-to-energy applications	16.30	Institut Teknologi Nasional Bandung



## OPENING REMARK

Asalamualaikum wr. wb.

Ladies and gentlemen, colleagues, and students,

It is our privilege to welcome you all to our 3<sup>rd</sup> International Conference on Green Technology and Design (ICGTD2021) hosted by Institut Teknologi Nasional Bandung (ITENAS), Indonesia. We would like to thank our 4 keynote speakers and more than 40 presenters who made their efforts to contribute to this conference. Two years ago, we hosted the first edition of ICGTD 2019 in a business as usual way, but the 2<sup>nd</sup> and the 3<sup>rd</sup> this year we still encounter an un-usual, unique and difficult moment due to a world-wide COVID-19 pandemic. This situation brings us here to meet each other virtually. This year conference topic of “Human Behavior in Green Technology and Design Research” is delivered with a big hope to rebuild strength to face post-pandemic period by enhancing collaborative research and outreach.

We appreciate the hard work of the organizing committee to bring in more than 40 articles to be presented in this conference, submitted by our international and domestic participants. All articles were then divided into 7 parallel session themes: Green Energy, Green Building, Green Automation, Smart Transportation, Sustainable Infrastructure and Environment, Intelligent Information and Communication Technology, Smart Materials and Adaptable Design. Accepted papers will be published on Scopus-indexed Proceeding, and following accredited journals: Elkomika, Jurnal Reka Lingkungan, MIND, and Rekayasa Hijau.

Ladies and gentlemen,

We realize current difficult situation and at the same time we prepare our readiness to welcome the awakening era for better future through increasing research quantity and quality as well as catalysing more collaborative efforts.

I sincerely hope you will enjoy all of the conference sessions, and hope that we can continue learning from and with each other. Someday, we hope to host you all directly in our beautiful campus and city.

Thank you all for your presence and participation.

Wassalamualaikum wr wb,

Rector of Itenas

Prof. Meilinda Nurbanasari, Ph.D

## FOREWARD



On behalf of the organizing committee, it is our great pleasure to welcome you all to the 3<sup>rd</sup> International Conference in Green Technology and Design (ICGTD) 2021 which is held here, in the Institut Teknologi Nasional (Itenas) Bandung, Indonesia. ICGTD is an annual conference organized by the Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM) Institut Teknologi Nasional Bandung. Currently, this is the third time we hold ICGTD.

The 3<sup>rd</sup> ICGTD 2021 aims to provide a platform for all researchers, academics and industries to exchange and collaborate multidisciplinary ideas and knowledge and push them further into actions. The outreach of this collaboration is the further understanding, approach, and implementation in Human Behavior in Green Technology and Design Research.

Acknowledging all these excellent works of all committee members, we would like to express our gratitude to the all authors, the international reviewers, the keynote speakers from Kanazawa University Japan, University of Fujairah -United Arab Emirates, Victoria University Melbourne Australia, and Itenas Bandung that are willing to share the valuable knowledge and experiences in this conference.

We strongly hope that this event brings the inspiring atmosphere for finding new ideas and contacts for future co-operations.

Chair,

Maharani Dian Permanasari, S.Ds., M.Ds., M.Phil., Ph.D.

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### **1. Experimental Study of Military Electric Car Performance (Kristyadi et al.)**

One of the electric vehicles that have been developed is a silent tactical vehicle. This vehicle is useful for military vehicles that can be used for silent operations, such as terrorist raids. This vehicle is equipped with a pneumatic bullet launcher that can be used to destroy obstacles. This vehicle is a silent vehicle and called Sergap Senyap vehicle. This paper describes the performance of military electric car that was conducted by experimentally. This vehicle has been tested both on the road and off the road and described the performance of bullet launcher. From the tests carried out both on road and off road, it can be seen that the longer the battery charging, the farther the distance obtained. The relationship between distance and battery charging duration is linear between 50 minutes to 150 minutes of battery charging time, but when the battery is charging above 200 minutes, the mileage tends to be constant. This shows that the battery capacity has a maximum limit. In testing the effect of pressure on the ejection distance of the bullet. The higher the pressure, the faster the piston pushes and the greater the kinetic energy given to the bullet so that the ejection distance is further away.

**Keywords:** Military, Electric, Vehicle, Bullet, Launcher

### **2. Tropical Ornamental Plant Hydroponic Product Design for Green Building Aesthetics (Putra)**


This study aims to determine the possibility of using ornamental plants as important facilities that affect the improvement of environmental quality in accordance with the concept of green building in interior and architectural spaces. The methodology used is through a systematic approach to product design in aero-hydroponic science and technology. The problem that arises in the community is the use of artificial plants for the beauty of space, which does not have a good impact on air quality. The solution offered is the design of tropical ornamental plant media products that can improve the aesthetic quality of space, which has a major impact in realizing green buildings that are currently dreamed of by urban communities in big cities. The conclusion obtained based on visual analysis, the working principle of aero-hydroponic can be used for space health.

**Keywords:** Green building, Aero-hydroponic, Product design, Ornamental plants

### **3. Inventory of Methane Emissions from Jalupang Landfill (Al-Madani et al.)**

Landfills have the potential to emit methane gas ( $\text{CH}_4$ ) which is a twenty times stronger greenhouse gas than carbon dioxide, thus triggering global warming.  $\text{CH}_4$  can also form secondary air pollution in the atmosphere that is toxic to living things especially humans, namely the formation of ozone from the reaction of methane gas with nitrogen oxides and carbon monoxide (anthropogenic emissions). In addition, methane gas that accumulates in piles of waste has the potential to cause explosions and landslides. Landfills in Indonesia are still generally operated by the open dumping method rather than sanitary landfill, as a result, the  $\text{CH}_4$  produced is not considered. It is necessary to calculate  $\text{CH}_4$  emissions as the beginning to do control of  $\text{CH}_4$  emission. The study is located at Jalupang Landfill, Karawang District, West Java, Indonesia. An emission





inventory was carried out to calculate the rate of CH<sub>4</sub> emissions using the 2006 IPCC and USEPA (Landfill Gas Emission Model [LandGEM] version 3.03 spreadsheet) methods. The results of the two methods produce numbers with significant differences. The results of the IPCC model are three times more than those of the LandGEM model.

**Keywords:** Jalupang landfill, methane gas, inventory, IPCC2006, LandGEM v3.03


#### **4. Biodiesel Production from Rubber Seed Oil as An Alternative Energy Source – A Review (Budiastuti)**

Biodiesel is one of alternative energies that can be used to overcome problem caused by limited amount of fossil fuels reserved. Biodiesel can be made from rubber seed oil that has high potencies in Indonesia. The availability of rubber seed is quite much with more than 3-million-hectare rubber plantation area. Biodiesel production from rubber seed oil had been done by several researchers using various methods. Therefore, this study was conducted as a review to obtain optimum operation conditions and effect of antioxidant addition in biodiesel production. Production methods of biodiesel from rubber seed oil observed in this study are esterification-transesterification, one stage transesterification, and in situ transesterification methods. Types of antioxidant added to biodiesel from rubber seed oil observed are TBHQ, D-TBHQ, BHA, BHT, PG, and OG. Esterification-transesterification was chosen as the most effective method in producing biodiesel with minimal yield of 96.4%. Antioxidant addition of TBHQ with  $1000 \times 10^{-6}$  ( $\omega$ ) dosage was selected as the most effective to increase biodiesel induction period to become 6.41 hours, fulfilling the SNI 7182-2015 standard, which is minimum of 6 hours. Standard used as the reference for observing biodiesel parameters is SNI 7182-2015.

**Keywords:** literature review, biodiesel, rubber seed oil, operation condition, antioxidant, SNI 7182-2015

#### **5. Effect of Co-solvent Addition on Biodiesel from Rubber Seed Waste (Safitri)**

Indonesia is one of the largest rubber producing countries in the world. Rubber seeds are agricultural waste that has not been utilized properly. One way to utilize rubber seed waste is by extracting the oil to be used as raw material for biodiesel production. This study aims to make biodiesel from rubber seed waste with the addition of co-solvent so that biodiesel obtained is as an environmentally friendly renewable energy. The stages carried out in this study were pre-treatment, extraction, esterification, transesterification, and product analysis. The pre-treatment process includes stripping, drying, and crushing. Extraction was carried out by soxhletation method using n-hexane solvent as much as 1:2.62 mass ratio. The esterification process used a 2.5%-mass H<sub>2</sub>SO<sub>4</sub> catalyst at a temperature of 60°C for 30 minutes. The transesterification process used a 1%-mass KOH catalyst with the addition of tetrahydrofuran as a co-solvent with a ratio of 1:1 to methanol at a temperature of 60°C for 60 minutes. The results obtained are biodiesel with the yield of 90%, density of 889.3 kg/m<sup>3</sup> and viscosity of 3.305 cSt, as well as transesterification time of only 60 minutes compared to 120 minutes without co-solvent addition.



**Keywords:** Biodiesel, Rubber Seed Waste, Co-solvent, Tetrahydrofuran

## **6. Comparison of Methane Emission Inventory between the IPCC and LandGEM Approach in A Tropical Landfill (Al-Madani)**

Landfills have the potential to emit methane (CH<sub>4</sub>) which is considered as greenhouse gas, thus triggering global warming. It is necessary to identify areas that are potentially exposed to the maximum concentration of methane gas to anticipate the impact on the environment. This study aims to analyze the distribution pattern of CH<sub>4</sub> gas emissions from the landfill and determine locations that have the potential to be exposed to the maximum CH<sub>4</sub> concentration. The study area is located at Jalupang Landfill, Karawang District, West Java, Indonesia. An emission inventory was carried out to calculate the rate of CH<sub>4</sub> emissions using the 2006 IPCC and USEPA (Landfill Gas Emission Model [LandGEM] version 3.03 spreadsheet) methods. Relevant activity data required for both methods were obtained from the observation done in the previous study. The results suggested that CH<sub>4</sub> emission calculated using the IPCC method was far higher than those estimated by LandGEM of more than two times. This discrepancy was caused by the selection of parameters that are more generalized for the LandGEM as compared to the IPCC. To select the most appropriate method measurement of methane flux rate should be done in the landfill directly.

**Keywords:** Methane, Landfill, Jalupang, LandGEM, IPCC

## **7. Obstacle Awareness System of An Indoor UAV with Multi-Sensor Fusion Algorithm (Kristiana et al.)**

A Flying Ad-hoc network (FANET) emerges recently due to its flexibility in terms of flying tracks and movements. As one type of Unmanned Aerial Vehicles (UAVs), a drone can be considered as the low-cost platform to implement the FANET. In a particular case, the flying tracks and movements of a drone can encounter inevitable obstacles such as building construction and any random objects. Thus, this paper focused on the obstacle issue in drone's movements and proposed the feasibility of Sensor Fusion algorithm to distinguish the obstacle in the indoor environment. Under two conditions: single and multiple obstacles scenarios, the autonomous drone implementing Kalman Filter in Sensor Fusion experienced the real time response linearly as the distance increases.

**Keywords:** Flying ad-hoc network (FANET), Kalman filter, Sensor fusion algorithm, Unmanned Aerial Vehicle (UAV), Obstacle awareness



## **8. The Effect of Collaborative Network, Information Sharing, and Resource Sharing on Fresh Fruits Supply Chain Performance (Tjaja)**

The increase in high demand for fresh fruit commodities recently can support economic development and the sustainability of farmers' businesses. However, the commodity's development still has many problems, especially in providing high-quality products and existing resources among farmers, resulting in poor performance. Therefore, this study examines the effect of collaborative networks, information sharing, and resource sharing on fresh fruits supply chain performance. It focuses on the agro-industrial in the area of gabungan kelompok tani LA (Gapoktan LA), West Java. Purposive sampling for in-depth interviews and questionnaires for data collection is used. Data were processed using SmartPLS3.3.3. The study results show that collaborative networks have a significant effect on the variables of sharing information and sharing resources.

**Keywords:** collaborative network, information sharing, resource sharing, supply chain performance, fresh vegetables


## **9. Electricity Demand Forecasting by Using Modified Fuzzy Logic**

Forecasting the demand of electrical energy is necessary, not only to ensure a balance between demand and supply of electrical energy but also to reduce the risk of an energy crisis in the future as a result of rapid economic and population growth. In this study, long-term electrical energy demand forecast for Banten Province in 2020-2030 using modified fuzzy logic is carried out. This study aims to determine the electrical energy demand of Banten Province until 2030 and its accuracy with electric company forecasts (RUPTL) compared to unmodified fuzzy logic. The data used are population, number of electricity customers, Gross Regional Domestic Product, and electricity consumption of Banten Province in 2010-2019. Modification of fuzzy logic is carried out on the fuzzy rules, so that modified fuzzy logic has fewer rule. In addition, unlike unmodified fuzzy logic rules, which has only one consequence from each antecedent, modified fuzzy logic rules has one or two consequences from each antecedent. Modified fuzzy logic in general has good forecasting ability with a MAPE value of 13.63% against historical data and has better forecast accuracy compared to unmodified fuzzy logic by increasing the accuracy of the overall forecast results to 12.27% and the combined sectoral forecasts to 6.34% against RUPTL.

**Keywords:** fuzzy logic, energy forecasting, fuzzy rules, fuzzy modification

## **10. The Relationship between Collaborative Performance System and Supply Chain Performance: A Study in Fresh Produce (Susanto et al.)**

The fresh produce commodities in the agro-industry sector that survive in the current situation. However, this commodity still has many problems, especially in the ability to provide product quality and the ability of existing resources, especially farmers as suppliers involved in it, impact the less than optimal performance of the company and its supply chain. This study aimed to examine the effect of collaborative relationships on company performance and the supply chain of fresh produce, which refers to the performance indicator factors of each variable, both at the individual level and at the supply chain level. The research method using purposive sampling and data analysis questionnaires from the results of in-depth interviews and data processing with structural equation



modelling (SEM-SmartPLS 3.3.3). The study results indicate that implementing a collaborative performance system has a positive and significant effect on the individual performance of company/individual performance and their supply chain collaboration.

**Keywords:** Collaborative Performance System, Supply Chain Performance, Company, Fresh Produce, Farmers

#### **11. Identification the Face Image of the Sick Sheep using Visual Geometry Group (VGG) 19 (Miftahuddin et al.)**

Sheep are livestock that ranks third after cows and goats that meet the needs of meat for the people of Indonesia, therefore it is very important to know the health condition of the sheep that will be consumed later. Sick sheep can be identified based on the sheep's facial expressions. In this study the authors applied VGG19 to identify sick sheep face. System performance is measured based on the value of accuracy, precision, recall, and F-Measure. After testing by testing starting from 50 epochs to 200 with a learning rate (0.0001), and trying various optimizers such as Adamax, SGD (Stochastic Gradient Descent), and Adam, the results show an accuracy value of 89.4% and an average precision of 65.6%, recall 81% and f-measure 69.7%, with an mcc value of 0.44 using epoch 100, learning rate 0.0001, and the Adamax optimizer. These values are influenced by the dataset of the training image of 800 images, the validation image of 229 images, and the test image of 144 images. In testing the search for the best side of the sheep's face image to be identified by the system and get the results that the sheep's face image from the front side gets an accuracy value of 94% with an average precision of 49%, recall 48% and f-measure 48% with an mcc value. -0.03.

**Keywords:** convolutional neural network; image classification; sheep face identification; visual geometry group (VGG19)

#### **12. Otsu Tresholding on Monitoring System PDAM Water Meter (Rosmala et al.)**

Image segmentation is a process of separating the foreground or object and the background or background. This separation process has problems, including those that often occur in pattern recognition, namely from the characteristics, thickness of numbers and also the results of image capture. Pattern recognition also has many identifications, one of which is using Otsu Thresholding. This thresholding method is used to automatically divide the histogram of the gray image into two different regions. The numbers detected are numbers on the PDAM water meter. For this PDAM meter, misunderstandings often occur in recording and many payments are not in accordance with the amount used. Therefore, a system was made to detect the PDAM meter number so that homeowners can see the amount of usage and the amount of fees to be paid. The system has 2 process flows, namely the process for training data is carried out manually and also the process for value identification is carried out through comparisons and differences in values from the threshold. The last step is to calculate the accuracy of image recognition. After testing the accuracy for image recognition obtained by 91% with testing as many as 100 images. For testing the error value and noise ratio of image segmentation, the average MSE value is 15.45dB and the average PSNR value is 45.421dB.

**Keywords:** *Otsu thresholding*, pattern recognition, billing information



### **13. Discovering and Evaluating Alignment of Process Models with SOP using Three Different Predictive Methods (Raharjo)**

Standard Operating Procedures (SOPs) are imperative tools for today's organizations to conduct their daily activities in which most of the activities are operated through information systems. SOPs are necessary to provide guidance as in which party is responsible and accountable for completing specific tasks, or in what order or sequence the activities should be completed. The absence of SOP can lead to problems in operations and can even lead to criminal cases such as frauds. This study attempted an approach to solve the absence of SOP problems by discovering process models from event logs extracted from an information system to predict which model can serve as SOP that reflects legitimate order of tasks. This study elaborated prediction techniques and methods for process discovery; Receiver Operating Characteristics (ROC) Analyses, four quality dimensions of process discovery, structural similarity, and behavioral similarity measures. As a referring instrument, we design a reference SOP that serves as the ground truth to gauge the measurements. The focus of this study is to evaluate the performance of each method and to find the correlation between the methods in discovering a process model which has the closest alignment with the SOP used as reference. The results from this study shows that the best models predicted from ROC and four quality dimensions calculations are not the best models to predict SOP as measured by similarity distance model.

**Keyword:** Standard Operating Procedures, process discovery, Receiver Operating Characteristic, four quality dimensions, structural similarity, behavioral similarity


### **14. Application of Kalman Filter and Fuzzy Logic to Control Temperature and Humidity of Tempe Incubator (Ungkawa et al.)**

The fermentation process of tempe takes a long time, which is about 24 to 48 hours. Several factors affect the success of this process. Among them are temperature and humidity. Tempe producers generally depend on the weather and do not control the temperature and humidity. Since the weather is often erratic, the ambient temperature and humidity of the process become undetermined. Another research found that the ambient temperature above the room temperature (28 C) will shorten the fermentation time by five hours. Another fact the author found is that tempe from the coastal area (hotter more humid) are tastier than the ones from a mountainous area. These two facts raise a question how if the tempe fermentation process takes place at the controlled chamber. This research proposes a tempe incubator controlled with a microcontroller to regulate the temperature and humidity of the incubator chamber. The first experimental result shows that the system will produce tempe for about 5 hours in the incubator chamber temperature of 41 C and 61% Relative Humidity.

**Keywords:** tempe, incubator, microcontroller, arduino uno

### **15. Relevance Vector Machine in Glaucoma Eye Disease Identification System (Miftahuddin et al.)**

Glaucoma is a chronic optic neuropathy characterized by curvature of the optic disc and narrowing of the visual field, accompanied by increased intraocular pressure. In glaucoma there will be a weakening of eye function with visual field



defects and anatomical damage in the form of excavation (reverberation) and degeneration of the optic nerve pupil which can end in blindness. Glaucoma identification process is done by eye fundus image. The process of identifying glaucoma is still done by the ophthalmologist manually by looking at the fundus image. There are already people who have done this research using the K-NN method, but the level of accuracy is still small and has not measured the processing time for glaucoma identification. Based on this, this study will apply the Relevance Vector Machine method to the glaucoma identification system on the human retina. System performance is measured based on the values of accuracy, precision, recall, and F-Measure. Experiments were carried out on the glaucoma dataset. The average values in terms of accuracy, precision, recall, and f-measure were 80% accuracy, 86% precision, 80% recall, and 79% f-measure, respectively. These values are influenced by the number of datasets from training images, validation images, and test images. Based on these results, the proposed Relevance Vector Machine has an 80% accuracy performance.

**Keywords:** Glaucoma, Relevance Vector Machine, Machine Learning


#### **16. Estimation of Baribis Fault Slip Rates Using 2016-2019 GPS Data Observations (Fuadi et al.)**

The surrounding area Baribis-Kendeng Fault is featured by active tectonic deformation. The slip deficit rate distribution is essential in explaining seismotectonics and assessing the risk of seismic hazards in this area because Java Island is the most populous island in the world. In this study, we collect GPS data from CORS stations and TPG stations then process the original carrier phase data of GPS to obtain consistent velocity field in ITRF2014. We assume two blocks separated by the Baribis fault: the Sunda block (footwall) and the Java block (hangingwall). The obtained velocity vector is used to estimate the Euler rotation parameter of each block. The estimated Euler poles parameters of the Java and Sunda blocks are estimated as their locations at 20.9°N, 120.2°E and 63.3°N, 112.2°W, respectively, and their angular velocities of 0.511°/Myr counter-clockwise and 0.263°/Myr counter-clockwise. These parameters produce Baribis fault slip rates with 3mm/yr with strike fault in all segments.

**Keywords:** GPS Data, Baribis Fault, ITRF2014, Euler Rotation, Slip Rates

#### **17. Salt Water Monitoring System: A Prototype IoT Platform (Permana)**

This paper presents an IoT prototype system for observing salt water content. Monitoring of large salt ponds is sometimes less than optimal. The use of information technology is carried out in order to assist pond farmers in managing their salt ponds. This study describes the initial steps in the use of information technology in observations in salt ponds. The prototype system is a representation of the salt water level monitoring system in salt ponds using IoT technology. The use of IoT technology is expected to make it easier for users to observe their salt ponds from anywhere and anytime with an internet connection. Connection to the internet will use the Wireless Sensor Network where the connection to the internet is done without using a cable. For input data will be obtained by using sensors. In this observation uses a temperature sensor and a TDS sensor. The data obtained will be stored in a database and presented in a website. This monitoring system is capable of displaying data on temperature and water content in salt water.



**Keywords:** Salt water, IoT, WSN, Monitoring System

**18. Wind Farm Sites Selection Using GIS and Multi-Criteria Analysis: The Case of Sumba Island – Indonesia (Akbar et al.)**

Renewable energy has grown rapidly nowadays. One of them is wind energy which also has been developed in Indonesia. One of the major technical challenges for wind energy development is to locate the areas with high suitability for placing wind farms, so finding suitable locations is critical for the economic success of wind farm operation. In the past few decades, Geographic Information Systems (GIS) have been widely used to assist for locating suitable sites for wind farms. In this study, GIS and multi-criteria decision analysis were used to select the suitable location for the wind farms in Sumba Island, Indonesia. There were five criteria used in the method, including distance to road, population density, wind potential, land use, slope, and added with exclusionary areas. The weighted overlay was used as the method to find the suitability wind farm sites with the concerns of geospatial layers related to the criteria. The resulted suitability map for the wind farm development in the study area gave five categories of suitability levels: unsuitable, very low, low, medium and high. Research results showed that around 21.5% area of Sumba Island fell into medium and high suitability levels. The method used in this study, if used with care, can be applied to other areas with a similar background.

**Keywords:** wind farm, renewable energy, GIS, multi-criteria analysis, weighted overlay, Sumba Island


**19. Literature Review on Production of Starch-Based Bioplastic as Substitute for LDPE/HDPE Plastic (Sandyanti et al. )**

Starch-based bioplastic reinforced by cellulose had been developed as substitute for LDPE/HDPE plastic but the developments into commercial scale are still limited. This literature review aims to determine the development of bioplastic manufacturing, the effect of raw materials of starch, cellulose type and methods on bioplastic characteristics, as well as its potential as a substitute for LDPE/HDPE in terms of its characteristics. The method used in this research was narrative review. Bioplastic made from high amylose starch with high cellulose content, and low glycerol content can increase the tensile strength. Whereas there was no significant difference found in the use of microcrystalline cellulose (MCC) and celluloses nanocrystals (CNC). Besides, the methods commonly used were casting with a moisture content to starch ratio of 6 to 30, and an operating temperature of 60-200°C. Unfortunately, the results of the starch-based bioplastic characteristics studied did not met yet the LDPE/HDPE plastic standards based on ASTM D638.

**Keywords:** Starch-based bioplastic, LDPE/HDPE, Starch, Cellulose, Glycerol

**20. Blended Workshop (online and offline) in Utilizing Banana Bark into Placemats (Permanasari)**

As one way of increasing the economic value of banana bark, this activity teaches the locals in Bukti village, Bali, to weave and to utilize dry banana bark into



placemats/coasters. Due to the COVID-19 pandemic circumstances, limitation occurs in various aspects, particularly in traveling. Thus, this activity uses blended methods by zoom meeting and later an offline workshop held in research partner's lab. This paper concludes the efficiency of two types of design workshop in the time of pandemic.

**Keywords:** design workshop, banana bark, product design

## **21. MOOCs, An Educational Disruption as Brand Touchpoints for Private Universities (Isnaini)**

Brand is a recognition and public perception of an entity that must always be maintained through adjustments to the situation, Today, anything that is done affects the brand, and private universities have various options to enhance their reputation and public recognition. The pandemic encourages all parties to think disruptively, one of which is online learning. The presence of the concept of Micro-Credentials Online Courses as an educational disruption is a new opportunity that can be utilized by every university, especially private universities that have to work to build public trust in the mid of uncertainty. Micro credential online courses or MOOCs can be used as a means of CSR and become a brand touchpoint that allows people to gain benefits in every interaction with a Private University.

**Keywords:** MOOCs, Disruption, Higher education, brand touchpoint

## **22. PANON (Portable Tent Stove) (Fernaldy, Permanasari)**


The pandemic-related travel restrictions have led people to focus more on domestic vacation options in the past two years. In Europe, camping is one of the main forms of accommodation for tourists. Taking Aesthetics inspiration from the Indonesian Terracotta stove (Anglo), Panon functions as a tent stove and heater. With a unique mechanism, simple assembly and safety measures, the product is expected to provide a great camping experience and work properly with other glamping equipment.

**Keywords:** glamping, tent-stove, unique, safety, work

## **23. Modular Vertical Garden As A Practical Solution for Urban Gardening (Alvaran et al.)**

Urban development without being balanced with vacant land for green area can harm the environment. Some of them are air quality and increasing noise levels that can impact on the human environment. One alternative solution to solve the problems is the application of vertical gardens in residential areas. To improve urban horticulture, it is necessary to design a vertical garden that provides ease of use. The modular system is one of the alternative solutions. A vertical garden is one solution in greening the city environment. With the growing interest in urban agriculture, especially verticulture, there are opportunities for vertical garden designs that can be easily applied in residential areas. The modular system emerged as a solution to improve ease of use. The purpose of this design project is to produce a modular vertical garden system that offers ease of use to help reforest the environment. This study uses a qualitative method to describe how the application of vertical gardens as an alternative to reforestation in supporting a smart environment. The method used is IDEO design thinking by conducting





identification, collecting and analyzing, brainstorming, development of concrete ideas, and implementation processes.

**Keywords:** Smart Environment, Vertical Garden, Reforestation

#### **24. Optimization of the K-Means Algorithm for the Classification of Public Transportation Feasibility (Rosmala et al.)**

One of the causes of decreasing air quality is the level of emissions from vehicles that produce particulates, which can reduce air quality. One of the motorized vehicles that frequently cross the road is public transportation, where public transport vehicles are a mode of transportation used to transport people or goods from one place to another. The cause of pollution caused by vehicle exhaust can be carried out by an emission test where the parameters used are Hydrocarbons (HC) and Carbon Monoxide (CO). The process of air pollution due to vehicle exhaust gases can be grouped so that vehicles with the same have are grouped into the same area and vehicles that have different lines are grouped into other areas. Therefore, the public transport feasibility clustering was carried out with the methods used in this grouping, namely the Elbow, Silhouette Coefficient, and Davies-Bouldin Index (DBI). The three methods are a process in determining the number of clusters or quality tests for each method being tested to obtain the most optimal results. Also, there is a Genetic Algorithm that can optimize in determining the initial center and the K-Means Algorithm performs the grouping process. The results of this grouping obtained a fitness value of 1,358187 and an accuracy value of 86.45% with a population of 10 and the intersection of the combined probability of 0.9 and the mutation probability of 0.1.

**Keywords:** K-Means Algorithm, Elbow, Silhouette Coefficient

#### **25. The Evaluation of Seeding Process of Tofu Wastewater Treatment in Anaerobic Sequencing Batch Reactor (Huwaida et al.)**

Anaerobic process was one of the possible options in the treatment of tofu wastewater by degrading its high organic compound into biogas. An improvement was applied in this research by designing the multi-purposes reactor in one column to run anaerobic digestion of tofu's wastewater, named Anaerobic Sequencing Batch Reactor (ASBR). The reactor consisted of 4 steps which were the filling process, reaction process, settling process, decantation process and idle. Cow manure was used as the inoculum, the bacteria was being seeded in seeding process as the important starting step of anaerobic process in ASBR. The aim of this research was to increase the concentration of anaerobic bacteria including acidogenic and methanogenic bacteria. The parameters measured during the seeding process were pH, COD, MLVSS, and biogas production volume. The seeding process was run in 25 days resulting in 3,282 mL cumulative biogas production and a high percentage of COD removal, which was 84.61%. The growth of anaerobic bacteria in ASBR was not optimum due to the lack amount of additional nutrition and the acid condition of the reactor.

**Keywords:** Seeding, Anaerobic process, Anaerobic Sequencing Batch Reactor (ASBR), Tofu wastewater



**26. The Characteristic of Adding Waste Cooking Oil on Bio-Pellets after Four-Week Storage (Kamal et al.)**

Bio-pellets are biomass that are crushed and compressed to achieve better combustion efficiency than the raw material. Ciliwung Center with its Gerakan Ciliwung Bersih (Ciliwung River Cleanup Campaign) has a program to process river waste into bio-pellet fuel production. The bio-pellets are thus sent to the power plant industry as oil-coal mixture. During the storage phase, some of the bio-pellets were overgrown with fungi as much as 86.5% and reduced the calorific value by 392 kcal/kg. The purpose of this study was to determine the best characteristics of bio-pellets after being stored for four weeks, both in suppressing fungal growth through the addition of used cooking oil. The method of the study adopted the spray of used cooking oil to the bio-pellet samples. Identification of fungal growth using image processing. The results showed that the addition of 200ml used cooking oil to the bio-pellets after four-week storage had a calorific value of 3,511 kcal/kg without any fungal growth

**Keywords:** Bio pellet, used cooking oil, fungi, calorific value


**27. Tofu Wastewater Treatment by Using Sequencing Batch Reactor (SBR) with Variation of Feeding (Budiastuti et al.)**

Tofu wastewater from the tofu production of home industries in West Bandung Regency has a high organic compound content, which is the range of 10,000-16,000 mg COD/L. One of the wastewater treatment systems that can be applied effectively is the Sequencing Batch Reactor (SBR) system. This system is the developed processing method from the conventional active sludge system into a sequential processing system. The operation of SBR consists of five stages, namely the stages of filling, reaction, settle, decant, and idle. The purpose of this study was to find out the best performance of SBR in improving the efficiency of tofu wastewater treatment. This study conducted seeding (seeding) and acclimatization to breed microorganisms degrading the tofu wastewater. The next stage, the stage of variations in feeding, consisted of running 1 and running 2. The SBR feeding at the times of seeding and acclimatization and running 1 amounted to 200 ml/day and amounted to 400 ml/day at the time of running 2 with a feed concentration of each running of 8,000 mg COD/L. The parameters tested were COD, MLVSS, DO, and pH. The results of this study were the best reduction in COD concentration from 8,000 mg/L to 96 mg/L obtained in running 1 and reduction in COD concentration from 8,000 mg/L to 160 mg/L obtained in running 2. The highest efficiency produced was 98.8% on running 1 and 98% on running 2. This highest efficiency resulted from the highest MLVSS of 9,176.7 mg/L, and the average values of pH, DO, temperature and turbidity parameters of 8.47; 7.05 mg/L; 24.1° C, and 9.36 NTU respectively. These parameters meet the Quality Standards in the Regulation of the Minister of Environment of Indonesia No.5 of 2014.

**Keywords:** Tofu Wastewater, Sequencing Batch Reactor (SBR), Feeding

**28. The Extraction of Curcuminoids from Ethanol Extract of Yellow Turmeric (*Curcuma longa* L) and Its Activity Test on P-388 Murine Leukemia Cells (Wati et al.)**

Research on the Extraction of Curcuminoids from Ethanol Extract of Yellow Turmeric (*Curcuma longa* L) and its Activity Test on P-388 Murine Leukemia Cells



has been carried out. This study aims to determine the percent yield, solvent concentration, activity of P-388 murine leukemia cells and pH on the amount of curcuminoids produced in ethanol extract. The curcuminoids were obtained by extraction process through soxhletation method using 70 and 96% ethanol solvent with a ratio of sample and solvent 1:8 with variations in operating time for 3, 6, 9 and 12 hours. The absorbance of curcuminoid extract was measured to determine the concentration of curcumin. Cytotoxic test on murine leukemia P-388 cells used the Microculture Tetrazolium Technique (MTT) method. The results obtained were yellow turmeric curcuminoid compounds using 96% ethanol solvent at extraction operating time of 9 hours, the largest extract yield was 21.15% with a concentration of 1121.10 ppm, has activity against murine leukemia P-388 cells with an IC50 of 6.15 g/mL has potential as an anticancer leukemia, and dye analysis at acidic pH (2,4,6) is yellow, while alkaline pH (9,12) is brownish red as a natural food coloring.

**Keywords:** curcuminoids, dyes, extraction, yellow turmeric


### **29. Coastal Vulnerability Index along the North Coast Java – Indonesia (Handiani et al.)**

The north coast of Java is an area with the highest maritime activities. These highest activities are threatening the ecosystem and environmental sustainability. Several areas already experience environmental degradation and most of the threats are ocean pollution, coastal erosion, continuous tidal flood (rob), and coastal subsidence land. Furthermore, the degradation is worsened by the threat of climate change in the coastal areas and it can cause the area more vulnerable to disaster. This study aims to evaluate the coastal vulnerability using the weighted coastal vulnerability index (CVIw). The method calculates coastal vulnerability by weighting physical coastal parameters using Analytical Hierarchy Process (AHP). CVIw calculation result shows that the vulnerability is dominant at moderate (35%) and high (60%) classes. The high vulnerability occurs in Karawang, Subang, Cirebon, Tegal, Batang, Kendal, dan Tuban Regencies. Meanwhile, very high vulnerability takes place in two districts: Pulomerak in Serang Regency and Jatinyuat in Indramayu Regency. Identified vulnerability in these areas can help local governments to prioritize their mitigation plan of coastal disasters.

**Keywords:** Coastal, vulnerability index, North Java, disaster, mitigation

### **30. Mobility Restriction Policy Effect to Travel-Activity Participation after the Policy Lifted: Evidence from the COVID-19 Outbreak in Indonesia (Rizki et al.)**

The changes in travel-activity and well-being during the COVID-19 pandemic, as a response to mobility restriction policy implementation, has raise a question on how travel-activity participation after the mobility restriction lifted will be. This study investigated how the mobility restriction policy, through the changes of activity, travel, and well-being, influenced activity-travel participation after the policy lifted. For this purpose, we conducted an online survey during the outbreak in Indonesia (in May 2020) and performed a Structural Equation Modelling to investigate the travel behaviour changes after the mobility restriction was lifted. The model shows that increase of travel after mobility restriction policy was lifted is associated with greater reduction in travel and lower emotional well-being during the mobility restriction period. While younger people tend to increase their travel, high net worth individuals tend to increase their online activity after mobility restriction policy. This study suggested a strict health protocol for activity location, especially for social and



leisure activity, increasing the quality of ICT infrastructure, and developing more green space near the residential areas.

**Keywords:** COVID-19, during the outbreak, mobility restriction, travel-activity changes

### **31. Implementation Evaluation Smart Mobility in Jakarta (Agni et al. )**

Urban problems, such as congestion caused by rapid population growth and high urbanization, are common problems in Jakarta. The concept of a smart city has developed and began to be implemented in several major cities in Indonesia, including Jakarta. One part of the smart city concept is smart mobility, which is currently developing to solve various urban problems, especially in public transportation to improve the quality of effective and efficient services. This study discusses the solution of applying the concept of the smart city. This paper aims to provide an overview of the level of smart mobility readiness implementation in the city of Jakarta, as well as the improvements that need to be done. This study uses a method of a literature study to get an early picture of conditions in Jakarta, then assessment using survey data assessment and qualitative analysis of descriptive. The results indicate that Jakarta is ready for the application of intelligent mobility. However, improvements and procurement in some aspects of intelligent mobility are deemed necessary.

**Keywords:** Smart Mobility, Jakarta, ICT, Indicator


### **32. Potential Trends of Cycling Mobility during the New Normal COVID-19 in Bandung City (Gunadi, Agustina)**

Bandung City Government wants to realize "Towards the Blue Sky of Bandung City" as an effort to reduce air pollution by creating bicycle lanes. Moreover the Bandung Smart City Master Plan has programs that support cycling mobility. Boleh bike sharing is a program to develop the city's smart mobility. During the New Normal of Pandemic Covid-19 saw an increasing trend in the use of bike (private) and Boleh Bike in the city of Bandung. This phenomenon is a chance to minimize the risk of virus Covid-19 spread when cycling by private owned bike and using Boleh Bikes, as well as a chance to develop the cycling mobility in Bandung City in the long term. The main objective of this study is to identify the potential for cycling mobility during the New Normal Covid-19 in Bandung City. Questionnaires were distributed to find out the advantages of cycling trend during the pandemic and its possibility in the post-pandemic period. The result shows that frequency and amount of new cyclists using private bicycles and Boleh bicycles have increased compared to before the Covid-19 pandemic. Respondents positive perceptions regarding safety and comfort, Boleh bicycle system facilities, and bicycle lanes become potential to develop cycling mobility during the New Normal Covid-19 to the long term until post-pandemic.

**Keywords:** Private Bicycle and Boleh Bike sharing, The New Normal Covid-19, Cycling Mobility, The Potentials

### **33. Model and Observation – Based Estimation of Methane Emission Emitted from the Landfills in Indonesia (Permadi et al.)**

Methane emission inventory is a compulsory for the government to be reported to the United Nations Framework Convention on Climate Change (UNFCCC) under the



National Greenhouse Gas (GHG) inventory program. One of the important emission source of methane is solid waste landfill. Long-term emission estimate can be done using the Landfill Gas Emission Model (LandGEM). Ground emission measurement is normally done to verify the model results. LandGEM model was simulated for 3 active landfills in West Java, Indonesia. Closed flux chamber (CFC) was used in the 3 landfills to measure the methane emission flux rates. The measured concentrations of methane inside the CFC were comparable to those measured in other tropical countries within a range of 500 – 10,000 ppm. Flux rates were then estimated and were converted to the emission in ton/year using the area of the landfills. Model and observation based estimations showed a comparable magnitude suggesting that the LandGEM model capability is somehow acceptable. Coupled methods should be use further to accurately estimate methane emission from other landfills in the country.

**Keywords:** solid waste, methane, LandGEM, closed flux chamber, landfill

**34. The Application of Safe Water Garden (SWG) Technology As An Option for the Reduction of Greenhouse Gas Emissions from the Wastewater Sector (Juwana et al.)**

Clean water and good sanitation are the main basic needs as one of the supporting human health, and they are not to be separated. Every living thing that consumes water and food as energy needs for activities will eventually produce waste. Approximately 80% of the use of clean water turns into wastewater. Therefore, clean water management is highly related to sanitation management. However, the fulfillment of clean water and sanitation needs has not been fully implemented in many parts of the world, especially in developing countries. As an effort to address poor sanitation systems in various rural areas, especially in developing countries, a technology name Safe Water Garden was introduced. This technology is an application of a septic tank system but can be used as irrigation for gardens. The main objective of this sanitation system in various rural areas is to reduce the public health impact of sanitation. This goal is to optimize the UNICEF system in terms of financing, performance, building capacity, and most importantly its capacity to connect local community experiences and to achieve benefits. In general, the improved system, named Safe Water Garden (SWG) has 4 main components, which are a closed tank, a leach field (garden), a pipe system that connects one to another, and a dishwashing facility that is made separately from the main system. The applications of SWG have various benefits, which are preventing disease (due to open air contact with human waste); raise social status (the house no longer smells and has a beautiful garden); improve quality of life (the SWG system is maintenance-free and children can safely play in the park); improve spiritual welfare (clean environment and clean public facilities in accordance with belief/religion), generate fixed income (plantation yields can improve the economy); provide household savings of 5–20% (from farm income and reduced health/maintenance bills); positive impact on the global environment (the system reduces the release of organic matter and nutrients); promote local ownership (can be built in one day, but SWG is a lifelong asset for rural families/schools); and affordable for everyone. These benefits can be felt directly as long as the owner follows the procedures and carries out the recommended maintenance.

**Keywords:** safe water garden, wastewater, sanitation, diseases



**35. Social Evolution: A Critical Review of Ecological City (Ecocity) Research and Practice (Mayona)**

This article explores the social evolution of ecological city (ecocity) an important aspect of a sustainable society. Over the last 33 years, ecocity in theory and application has evolved along with broader trends in social thought. The original concept of ecocity emerged from activist movements as an approach to urban development that would respect environmental limits. The early concepts of ecocity interpreted the city as a living system that regards the evolution of the physical, social, and environmental. Unfortunately, although many ecocity projects market themselves as models for sustainable urban development, they lack social consideration. The purpose of the article is to describe social evolution in research and practice of ecocity. Therefore, we can see the dynamics and gaps between the early concepts and the development of research and practices. This article describes this gap through a critical review of how the concept has been elaborated in theory and application. Social evolution can provide information about the crucial aspects that it needs to be completed and studied. Therefore, ecocity can play a role in a broader process of social evolution towards a more sustainable society.


**Keywords:** ecocity, practice, research, social evolution

**36. Exploring Urban Congestion Patterns in Metropolitan during the COVID-19 Pandemic Based on Google Maps: Insights from Metro Bandung, Indonesia (Saputra, Meliana)**

COVID-19 is a virus that has emerged since the end of 2019. Its rapid spread has caused almost all countries affected by the virus. In order to prevent the spread from spreading further, government of the whole countries have restricted the movement of people during the COVID-19 Pandemic, including the Indonesia's Government. During the COVID-19 Pandemic, the Government launch some policy that restrict the movement of people like PSBB and PPKM, especially in Bandung. In order to know the effectiveness of government policy in restricting the movement in Bandung, Google Maps can be used to find out the congestion pattern in Bandung before and during COVID-19. The purpose of this study is to know congestion patterns in Bandung before and during COVID-19 period. The research method used consists of 3 (three) stages, namely determining which roads will be reviewed for traffic, collecting traffic data by recapitulating the amount of smooth traffic, heavy traffic, and congested traffic based on Google Maps, and analyzing congestion patterns. The data was processed by quantitative descriptive methods, and the congestion patterns in this study were classified on weekdays and weekends. Based on the results of data collection and analysis, it is known that each road has different congestion characteristics. The road that connecting Bandung City and other district has higher proportion of congestion than other roads. The government's policy to restrict the people movement during COVID-19 has caused a decrease congestion pattern in Bandung compared to before the COVID-19 Pandemic in 2018. Based on this, it can be concluded that the majority of people have followed the government's policy not to travel and only travel when important.

**Keywords:** COVID-19, Congestion, Traffic, Google Maps

**37. Mapping of Oil Palm Age Based on Google Earth Engine toward One Data Oil Palm Management (Darmawan, Hernawati)**



According to the Ministry of Agriculture of the Republic of Indonesia (2019), it was informed that foreign exchange earned from oil palm decreased by 20%, this was due to the large of old oil palm that were less productive and also many oil palm affected by disease. In order to increase oil palm productivity, the President of the Republic Indonesia given Instruction No. 6 of 2019 concerning the National Action Plan for Sustainable Oil Palm Plantations for 2019-2024, with one of the actions to increase national oil palm productivity being strengthened data, coordination, and infrastructure. The aim of this study is to produce mapping of oil palm age based on Google Earth Engine (GEE) toward one data oil palm management. The methodology includes data collection, georeferencing, estimation of oil palm age, and visualization. The result showed mapping and visualization of spatial distribution of oil palm age in Indonesia. For further direction, the oil palm age mapping will be integrated with geodatabase one oil palm data management.

**Keywords:** Oil Palm, Remote Sensing, GEE, and visualization


**38. Are There Any Changes in Travel Behaviour? Investigation of the Impact on the Bandung Metropolitan Area Due to the COVID-19 Pandemic (Kameswwara et al.)**

The Covid-19 pandemic officially became a global health emergency around January 2020 which was set by WHO. Governments from all countries including Indonesia are facing collateral impacts that ensure new challenges for urban management including aspects of transportation. From previous studies, it is known that travel behavior and mode preferences are substantially different during the pandemic situation from the normal situation before the pandemic. The Bandung Metropolitan Area / Bandung Metropolitan Area (BMA) is one of the areas with a high density in Indonesia that has also received the impact of Covid-19. BMA, which is part of the West Java constellation, is also one of the focus areas for handling, including the implementation of large-scale social restriction policies in Indonesia. The policies that have been made are expected to be able to control and stop the spread of the COVID-19 virus. So understanding the influence of traveling behavior on the spread of the virus can be the key to increasing efforts to control the pandemic. However, this behavior cannot be explained in detail whether the changing travel characteristics occur in all BMA community groups. Therefore, this study aims to determine changes in the travel behavior of residents in the Bandung Metropolitan area due to the COVID-19 pandemic based on the socio-demographic side, especially seeing the impact on certain community groups. This research will also use an exploratory approach and statistical analysis tools on approximately 400 respondents, namely the productive age community of BMA through questionnaires.

**Keywords:** Covid-19, Metropolitan, travel behavior model, social demographic

**39. The Influence of Land Use on the Characteristics of Organic Compound in Water (Dirgawati et al.)**

Dissolved Organic Matter (DOM) is the most important fraction of natural organic compounds (NOM), because it affects the performance of conventional water treatment plant (WTP). However, in practice, the WTP managers only measure Total Organic Matter (TOM). This study aimed to determine the effect of land use on the raw water characteristics and NOM, the relationship between TOM and DOM, and the DOM compounds. The study was conducted in the rainy season at two sampling points: the first sampling point was in the upperstream of Cimahi River which was




dominated by the settlements (Point-1), and the second sample point was in the upperstream of Cijanggal River which dominated by plantations (Point-2). The water samples were analyzed without filtered (unfiltered samples) and filtered with 0.45 m filter membran (filtered samples). The measured key parameters of water characteristics included pH, electrical conductivity, nitrite and nitrate. The measured parameters of organic matter were Chemical Oxygen Demand (COD) and Chromophoric NOM parameters (A254, A355, A3/4). For the filtered samples only, the fluorescence DOM (FDOM) was also measured. The results showed pH of both filtered and unfiltered samples were in the neutral range. The measured parameters of water characteristics and organic compounds in the unfiltered samples were greater than those of in the filtered samples, indicating the the effect of suspended material on these parameters. The measured parameters of water characteristics and organic compounds in the point-1 were greater than those of in the point-2. The characteristic of point-1 indicated that DOM was mainly originated from the terrestrial with A355 >0.06 cm<sup>-1</sup>, and more humic with A254 of 0.15 cm<sup>-1</sup>. Meanwhile in the sample-2, the measured A355 and A254 were 0.02cm<sup>-1</sup> and 0.08cm<sup>-1</sup>, respectively. The main organic compounds of the point-1 samples were two protein-like compounds (T1 and T2), fulvic acid (A) and humic acid (C). Meanwhile in the point-2 samples, T2 was not detected. There were significant relationships (p=0.05) between COD of point-1 and point-2 samples, between TOM and DOM (r=0.80 at point-1, and 0.96 at point-2). A significant relationship between TOM and DOM for CNOM parameters was observed in point-1 only for DOM-A254 vs TOM-A254 (r=0.77).

**Keywords:** organic matter, landuse, raw water

#### **40. The Use of Safe Water Bricks (SWB) in the Construction of Safe Water Garden (SWG) as An Option for The Reduction of Greenhouse Gas Emissions from Plastic Waste (Juwana et al.)**

Solid waste is the excess of human use that is no longer required. Based on National Regulation No. 18 of 2018, it was mentioned that all parties are required to reduce solid waste as much as possible. As an effort to reduce the waste, it is necessary to carry out treatment since the source of the solid waste, through the reduce-recycle-reuse (3R). Plastic waste is the most difficult waste to manage because it takes a long time to decompose plastic. One of the ways of reusing plastic waste is by making Safe Water Brick (SWB). SWB is a substitute material for bricks for the construction of the Safe Water Garden (SWG). The materials used for the manufacture of SWB consist of bottles, plastic waste, cloth residue (optional residue) and sand. The principle of SWB is the same as ecobricks, with heavy volume and quite dense. The function of the SWB is to reduce the generation of plastic waste and fabric residue in the study area, the Nagrak Village. The results of surveys and interviews in the study area show that Nagrak Village has poor solid waste management. Currently the people of Nagrak Village dispose their waste directly to nearby disposal or by burning the waste. In some families, people dispose of their organic waste directly into the environment or give it as animal feed. Before the actual SWB production, community training was given. During the training, the community is explained regarding the purpose, benefits, functions, procedures and materials for producing SWBs. The implementation of the training was very well received by the people of Nagrak Village. After one week from the time of the SWB training, during the monitoring it was found that most of the participants continued making SWB. People can make 3-5 bottles of SWB in one day depending on the activity they are doing. The difficulties experienced by the average community include the difficulty of





collecting the remaining plastic packaging (garbage), this is because they are used to burning their waste. Once all SWB were produced, they were then used as the replacement of conventional bricks for the construction of Safe Water Garden.

**Keywords:** safe water bricks, plastic waste, recycle

**41. TPS-3R Functional Level Measurement Tool Design and Development (Case Study in Bandung City TPS-3R) (Prabowo et al.)**

TPS-3R is a regional waste management system that involves the local government and the community in a community empowerment strategy based on the Reduce, Reuse, and Recycle philosophy. There is currently a measuring instrument for evaluating the TPS-3R's level of functioning, however there is still the risk of subjectivity from the assessor while using the measuring tool. This can happen if there isn't a supporting reference to ensure that each parameter in the measuring equipment is validated. This measuring tool is essential for ensuring that the TPS-3R that has been constructed is operating correctly. As a result, a study was carried out to improve existing measuring instruments by creating a questionnaire to serve as a means/guide for filling out this measuring instrument. This study aims to improve existing measuring tools for evaluating the TPS-3R's level of functioning by developing and reviewing aspects, parameters, and previous indicators based on a review of literature studies, which were then validated through interviews with TPS-3R managers using a questionnaire validation instrument. This instrument is used to assess the TPS-3R functioning level measuring instrument that was constructed. Five aspects, 37 factors, and 111 indicators were found as a result of this research.

**Keywords:** TPS-3R, Measuring Tools, Aspect Parameter, Indicator



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